ETIP Bioenergy
European Technology and Innovation Platform

11th Stakeholder Plenary Meeting

BLAZE

GICO2
Gasification Integrated with CO2 capture and conversion

Accelerating towards the 2030 targets

Good practices in improving social acceptance in new energy technologies

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Social acceptance of bioenergy technologies

1 Technical the technologies have to exist, to be reliable, easy to use: in general bioenergy technologies are more complicated and less reliable!

2 Economic The price (of the product and so capex and opex of the biomass plant) is in general higher of other technologies!

3 Environmental Biomass plants emissions are in general higher!

Small scale is better (low density and perishability) but worst tec/eco/env values!

BUT

Biomass is integral to life (where there is life there is biomass and biomass theoretical/technical potentials are greater than energy consumption).

Biomass is connected to food and materials thus is fundamental in realising a sustainable world. So biomass is not only a energy sources but it is connected to the environment, to the biodiversity and to the life.

The problem is not its potential (also as biomass waste) but in its efficient, reliable, sustainable use!

Simplified social perception: From denuclearization to decarbonization

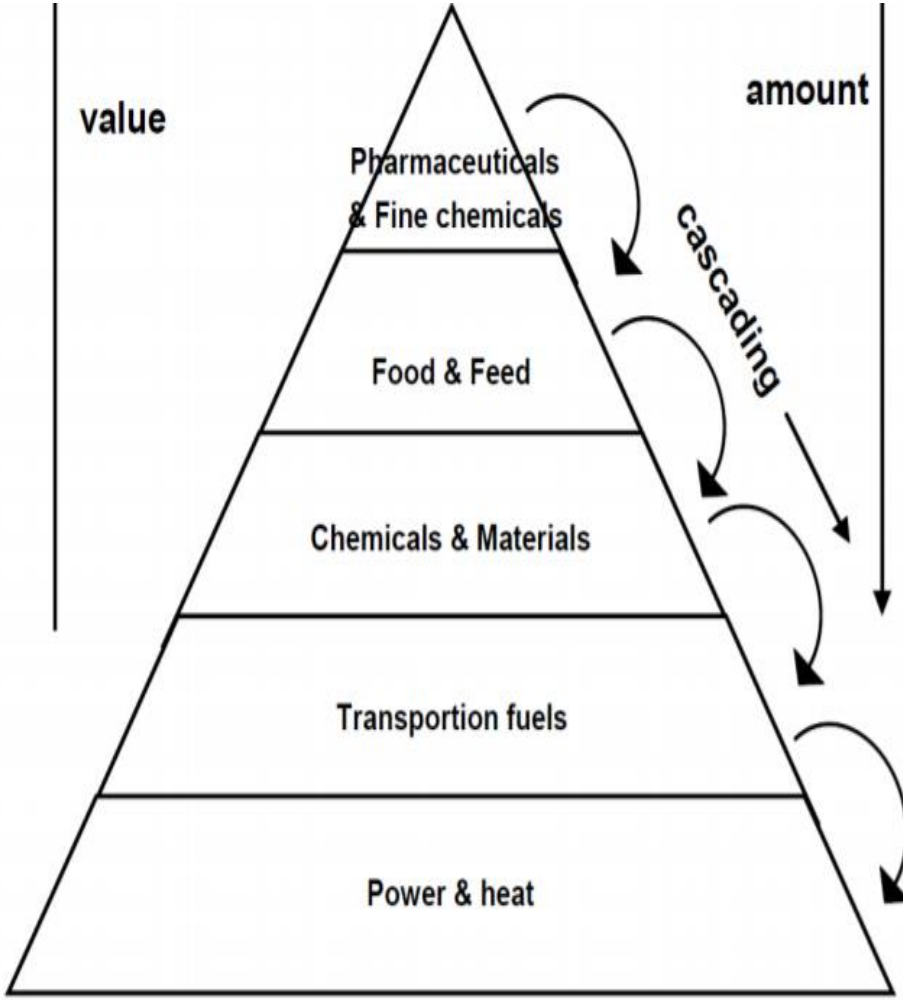
1990

2022

THE ECONOMICS OF BIOMASS from 0-100 €/t to 500 €/kg

Feedstock price is the largest component of operating costs for the biomass plant

Strongly related to costs issues are the availability and the full-scale demonstration of advanced conversion technology, combining a high energy conversion efficiency and environmentally sound performance with low investment costs with a clear and stable framework



ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

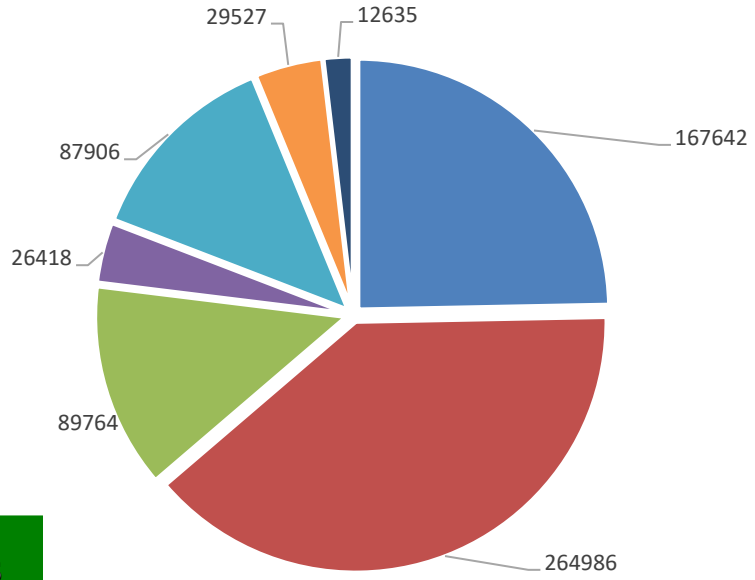
- The biomass use, especially on the large-scale, involves a wide range of environmental implications: soil fertility; leaching of nutrients and biodiversity; deforestation and erosion; landscape, water use; fire and disease; air, water and ground pollution.
- First there can be polluting emissions due to the: “bad” “use”; fertilisers and pesticides production; cultivation and harvesting.
- An accurate analysis and design can change the potential negative into positive impacts.

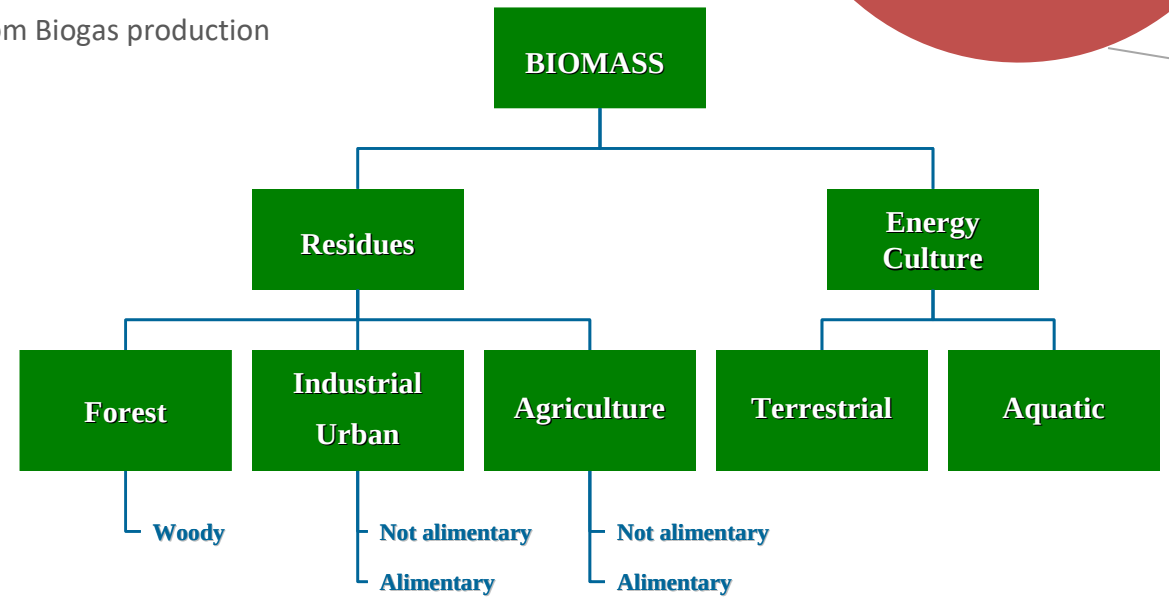
ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

- Bio-energy systems require complex organizations, many actors and substantial land areas but have employment benefits and are available in most countries.
- The global economic pressures have pushed the industries (sugar, paper and pulp, waste) to greater efficiencies and to search more than before the efficient waste use.
- Carbon taxes, price supports, stable legal framework and long-running research and development (R&D) programmes are central.

Biomass types complexity

- Primary residues from forest
- Agriculturas residues
- Secondary residues from wood industries
- Secondary residues of industry utilising agricultural products
- Municipal waste
- Waste from wood
- Digestate from Biogas production





Pretraitment complexity

BEFORE

AFTER

Winery wastes

Out-of-use woods

Green wastes

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Complex properties and Chain

Preliminary A.	RANGE
Humid.Content-moisture	10-70%
NetCV-LHV on a daf (dry, ash-free) basis	4-22 MJ/kg 1-6 kWh/kg
Volatile matter	30-80%
Fixed carbon	15-30%
Ash	1-30 %

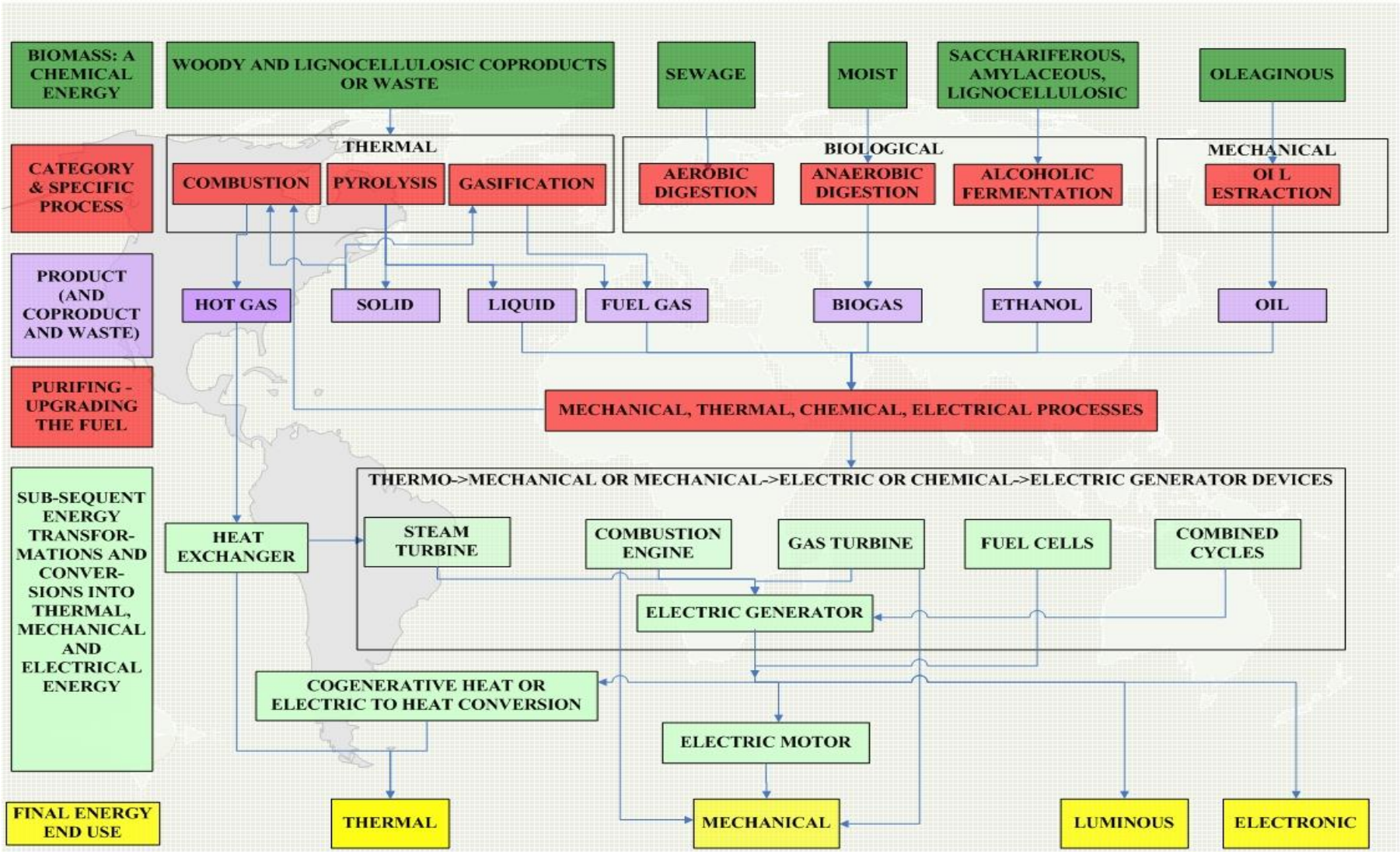
Elemental A. %wt	RANGE
Carbon	40-60%
Oxygen	35-45%
Hydrogen	5-7%
Alkali metal and inorganic element	1-15%

- Bulk Volume and Density (varies from 4 to 50 m3/t, daf) and size
- Times of cultivation months-years; Yield, 5-50 dmt/ha/a; waste to 20-80%wt;

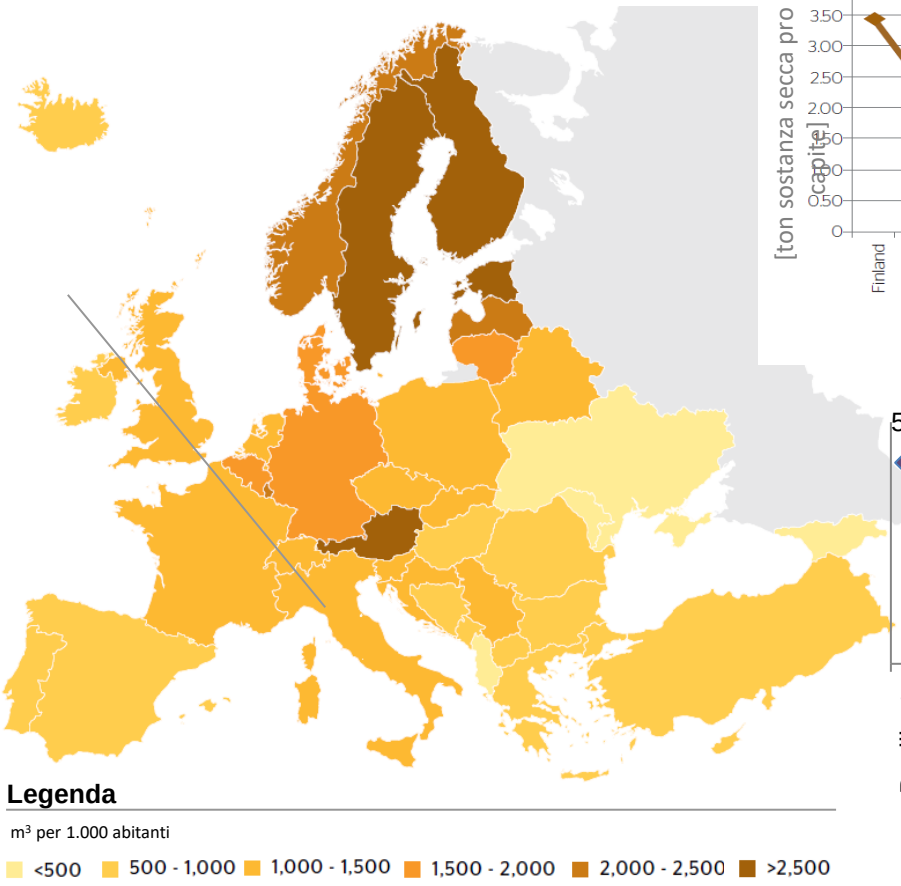
COMPLEX CHAIN

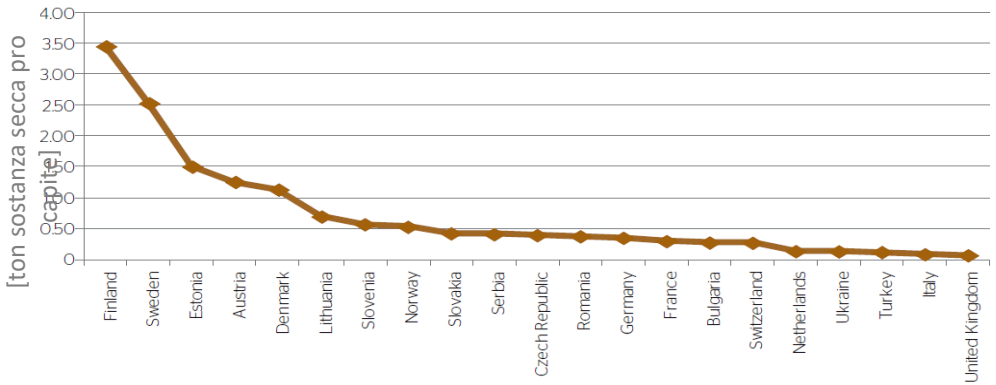
Production (cost neg.-30 €/GJ; 3-100 €/t), Transport, Storage, Conversion, Emissions/Coproducts

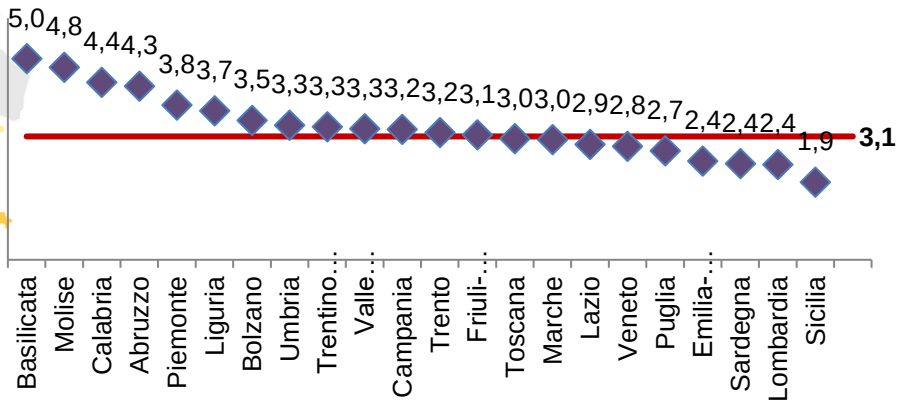
Complex Conversion Technologies



Biomass use depends on environment and history







Fonte:State of Europe's forests 2015 Report

Europe from forestry: 2,39 m3/ha/year – Italy 1 m3/ha/year!

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Unifhy: H2 from Biomass 2012/2015

7FP-FCH-JU-299732 Realised 1 MWth gasification plant of lignocellulosic biomass that produced H2 99.99% for 120 h in 2016

7 Partners:
4 Industrial companies,
2 Universities
1 Research organisations

4 Member States:
France, Germany, Italy and Netherlands

3 years duration:
Project start on September 1st, 2012

Budget €3.3M:
€2.2M EC Grant
€1.1M own Partners funding

An European project, supported by the European Commission's 7th Framework Programme

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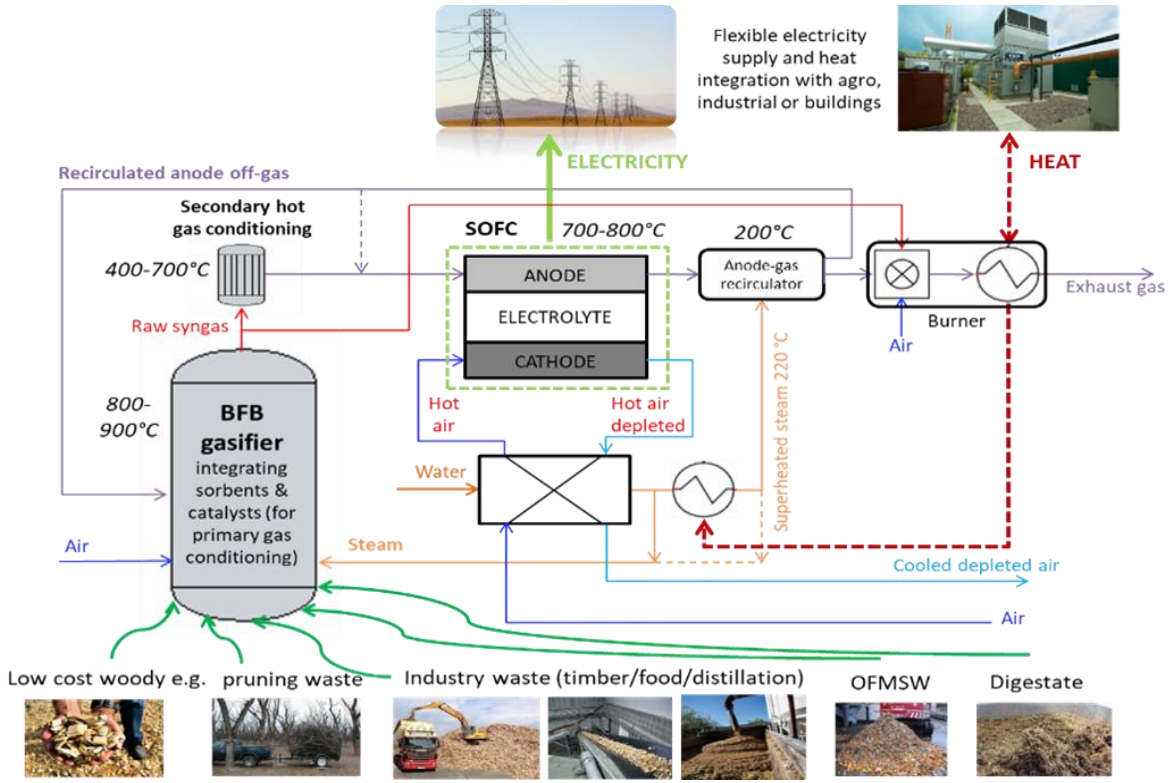
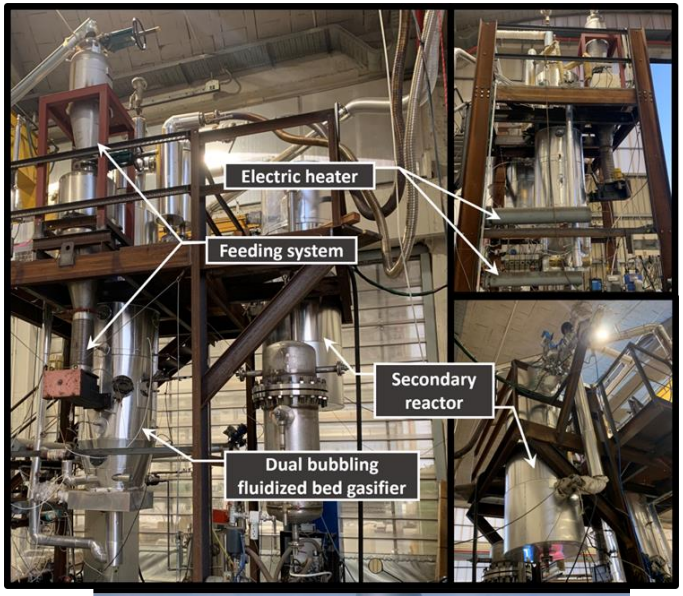
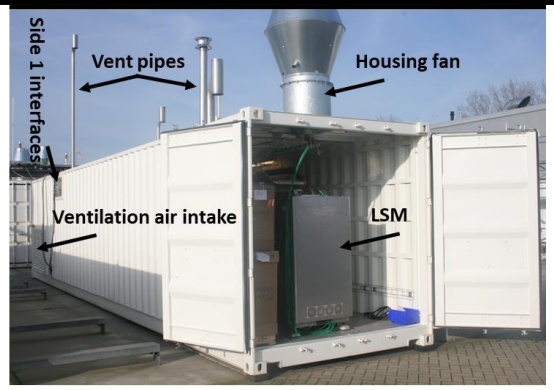
BLAZE: Coupled 100 kWth DBFBG with 25 kWe SOFC in 2023







-8 WPs
-4 years project (2019-2023)
-€ 4 255 615,00 funds
-14 partners

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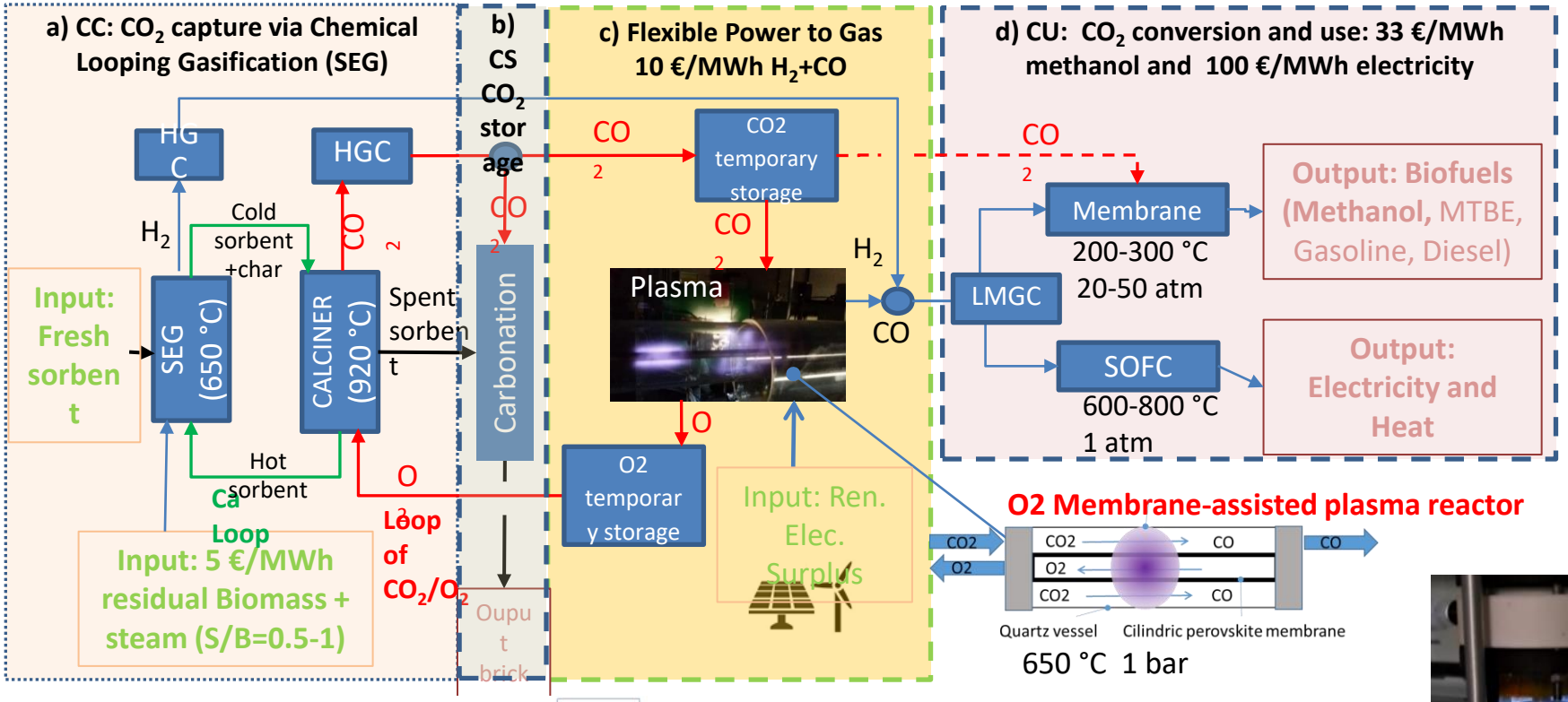
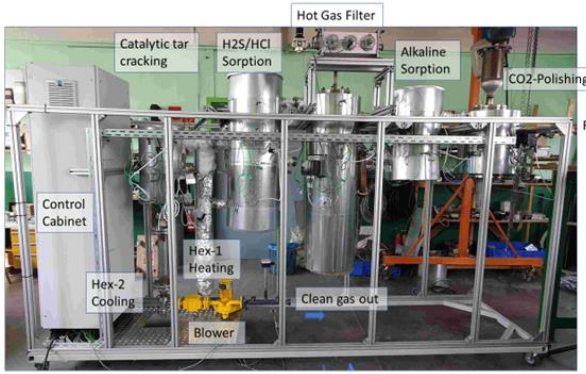
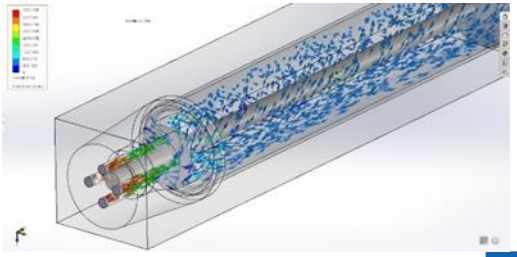
GICO: Gasification with integrated CCUS







-6 WPs, 4 years project (2020-2024), € 3 928 257,50 funds
-11 partners

KEY TAKEAWAYS

Biomass is integral to life. Problem is its efficient, reliable, sustainable use not its potential. Biomass always used linked to food, materials and environment: its use depends on environment and history.

Biomass has complex definition, classification, properties, chain, conversion technologies thus technologies are more complicated and less reliable with higher costs and emissions!

Biomass R&D try to develop more efficient, reliable, sustainable biomass technologies but small scale and more complex plants have worst tec/eco/env performances!

THANK YOU!

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